I claim:

1. An image processor for determining geometric distortion of an image; the process comprising:

a halftone screen threshold analyzer for creating a target orientation signal by applying a halftone screen threshold mask to image data from a received image; and

a correlation operator for correlating the target orientation signal with the received image in a correlation domain, the correlation operator producing one or more orientation parameters estimating geometric distortion of the image.

2. The processor of claim 1 wherein the orientation parameter is used to re-align the image to facilitate decoding of a watermark from the re-aligned image.

3. The processor of claim 2 wherein the watermark carries a message of one or more symbols.

4. The processor of claim 2 wherein the watermark is analyzed to detect alteration of the image.

5. A method of determining geometric distortion of an image that has been generated using a halftone screen, the method comprising:

applying a halftone screen to the image to create a target orientation signal; and

correlating the target orientation signal with the image to compute an orientation parameter estimating geometric distortion of the image.

6. The method of claim 5 wherein the orientation parameter is used to re-align the image to facilitate decoding of a digital watermark from the re-aligned image.

7. The method of claim 5 wherein the digital watermark carries a message of one or more symbols.

8. The processor of claim 6 wherein the digital watermark is analyzed to detect alteration of the image.

5   9. A method of embedding a digital watermark in a halftone image, the method comprising:

receiving an input image;

modifying the input image to embed a digital watermark in the input image and to convert the input image into a halftone image; wherein the modifying includes applying a

10   halftone screen to the input image, the halftone screen being formed such that application of the halftone screen to the halftone image produces an orientation signal from which geometric distortion of the halftone image is derived.

10. The method of claim 9 wherein the digital watermark carries variable

15   message symbols that are machine readable from printed versions of the halftone image.

11. The method of claim 9 wherein the modifying includes:

converting the input image to a target resolution of the halftone image;

combining the converted image with the digital watermark to form a watermarked image;

20   and applying the halftone screen to the watermarked image.

12. A tangible medium on which is stored instructions for performing the following method:

receiving an input image;

25   modifying the input image to embed a digital watermark in the input image and to convert the input image into a halftone image; wherein the modifying includes applying a halftone screen to the input image, the halftone screen being formed such that application of the halftone screen to the halftone image produces an orientation signal from which geometric distortion of the halftone image is derived.

13. A tangible medium on which is stored instructions for performing the following method:

applying a halftone screen to an image to create a target orientation signal; and

correlating the target orientation signal with the image to compute an orientation

5   parameter estimating geometric distortion of the image.

10